

Remarks

Support for amended claims 1-5 and 2-29 in the Specification as filed

As originally written, Applicants' claim 1-5 were directed to "code that includes
 5 symbolic names and is executable in a program execution environment". Claims 22-29 employ the term "code" in a similar fashion. In order to make it clear that their claims 1-5 and 22-29 are not addressed to "code *per se*", Applicants are amending those claims to replace "code" with "software object".

10 The term "software object" does not appear in Applicants' Specification; it is, however, well known in the relevant technologies. A particularly relevant definition of the term in the present context is that found in the *Java Tutorials* at java.sun.com/docs/books/tutorial/java/concepts/object.html. The cited location was last updated 2/14/2008. The definition reads as follows:

15 Software objects are conceptually similar to real-world objects: they too consist of state and related behavior. An object stores its state in *fields* (variables in some programming languages) and exposes its behavior through *methods* (functions in some programming languages). Methods operate on an object's internal state and serve as the primary mechanism
 20 for object-to-object communication. Hiding internal state and requiring all interaction to be performed through an object's methods is known as *data encapsulation* — a fundamental principle of object-oriented programming.

The exemplary embodiments of Applicants' inventions which are disclosed in his
 25 Specification are Java byte codes. These byte codes clearly conform to the above definition and are thus one of many kinds of software objects. Since that is the case, the disclosure of the application as filed supports the use of "software object" in the claims as amended.

30 Claims 1-5 and 22-29 have further been amended to further specify the relationship between the software object and the execution environment which executes the software object and between the execution environment and the processor in which the execution environment executes as well as to more clearly specify the behavior of the execution

environment during execution of the software object. The behavior of the execution environment is of course supported at least by portion 1617 of FIG. 16 and the description of the portion at page 27, lines 20-33 of the Specification as filed.

- 5 Claim 1 has further been amended to replace the term “authenticity of the code” with the language “whether the software object has been altered prior to the software object being executed in the program execution environment”. This language is similar to language employed in claim 22 and is fully supported by the Specification as filed. One of many examples of support may be found at page 29, lines 6-16.

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The rejection of claims 1-5 and 22-29 as addressed to “a program per se”

The terminology employed by Examiner in his rejection suggests that the rejection is based on the discussion at MPEP 2106.01, *Computer-Related Nonstatutory Subject Matter* (MPEP 2100, Rev. 6, Sept. 2007, pp. 2100-17 to 2100-18). Applicants’ Attorney
15 respectfully submits that by the terms of MPEP 2106.01, Applicants’ claims 1-5 and 22-29 as amended are clearly addressed to statutory subject matter.

Claim 1

- In claim 1 as presently amended, the software object is “contained in a memory device
20 accessible to the processor” and the claim further sets forth how the claimed limitations of the software object are employed by the execution environment as it executes in the processor to “resolve the obfuscated symbolic names” and to “determine whether the software object has been altered prior to the software object being executed in the program execution environment”. Thus, as discussed at 2100-18, the claimed “software
25 object” is “functional descriptive material” and consequently addressed to patentable subject matter.

Claim 22

- This claim is directed to “a method of protecting a software object” and is therefore
30 clearly statutory. As amended, claim 22 makes it clear that the software object is

“executed in an execution environment for the software object in the host computer system”.

5 **The rejections of claims 1-29 under 35 U.S.C. 103 as obvious over the combination of Monden and Valdez**

As Examiner is aware, in order to make a rejection of a claim under 35 U.S.C. 103, Examiner must make the *prima facie* case of obviousness set forth at MPEP 2142. A required element of the *prima facie* case is that the references which form the basis of the
10 rejection together disclose all of the limitation of the claims under rejection. Monden and Valdez do not do so, and consequently, Examiner has not made his *prima facie* case.

Detection of alteration of the software object or program

Independent claims 1, 6, 14, and 22 all include limitations which involve detection of
15 alterations in the software object or program being executed by the execution environment. Neither Monden nor Valdez contains any disclosure whatever concerning such techniques. Applicants use static and dynamic watermarks to detect such alterations, Monden adds static watermarks to his code, but as already pointed out in the *Response to the written opinion*, Monden’s static watermark identifies the owner of the
20 code. It contains no information about the code itself, and therefore cannot be used to detect alteration of the code. As for Valdez, Valdez gives a taxonomy of “threats” at the bottom of page 382 and the top of page 383. One class of threats is described as follows:

25 Tampering, denoted as ALTER, is when unauthorized modification, such as adding, deleting, or changing instructions, of programs occurs.

Two paragraphs further on, Valdez explicitly states that his paper does not address ALTER, i.e., discloses nothing about detecting alterations in the software objects or programs of Applicants’ claims. Because neither reference discloses anything about
30 detecting alterations on the software objects or programs of the claims, the combination of the references cannot disclose the claim limitations concerning detecting alterations and Examiner has not established his *prima facie* case with regard to the claims.

Use of encryption to obfuscate symbolic names

In combining Valdez with Monden in his rejection, Examiner admits that Monden discloses nothing whatever about the use of encryption to obfuscate symbolic names. Valdez, however, also does not provide any disclosure concerning this limitation. As is clear from the paragraph at the middle of page 386 of Valdez, obfuscation and encryption are unrelated operations:

In a typical situation, when all the transformation primitives are selected, the hiding tool works as follows: First, obfuscating transformations then scrambling transformations are applied. Noise instructions are inserted either at random or at specified locations in the preselected sections. ... Then the substitution primitive is applied. Original instructions are replaced with equivalent instructions. ... After applying the noise and substitution primitives, the processed sections are decomposed into blocks of some finite size, and a random permutation order is applied on these blocks. Then from these blocks, blocks are randomly selected for encryption and/or compression. ... Note that these transformation primitives can be interleaved and applied at different levels of granularity.

There is simply nothing here or anywhere else in Valdez that deals with the specific problem for which encryption is employed in Applicants' claims, namely effective obfuscation of symbolic names. Since that is the case, Examiner has also failed to make his *prima facie* case with regard to the claim limitations involving encryption that is employed to obfuscate symbolic names.

The amendment of the title as listed in the filing receipt

This amendment simply corrects a typographical error made in the USPTO and returns the title to the title of the application as filed.

Conclusion

Applicants have amended their claims to overcome Examiner's rejections under 35 U.S.C. 101 and have demonstrated that the claims as amended are fully supported by the Specification as filed and that the claims as amended are addressed to patentable subject matter. Applicants have further demonstrated that Examiner has not made the *prima*

facie case of obviousness required for a rejection under 35 U.S.C. 103. Applicants have thereby satisfied the requirements of 37 C.F.R. 1.111(b) and respectfully request that Examiner continue with his examination and allow the claims as amended, as provided by 37 C.F.R. 1.111(a). The fee for a 1-month extension of time accompanies this response; should any other fees be required, please charge them to deposit account number 501315; any overpayments should be credited to that account.

Respectfully submitted,

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7/9/2008